reductions through 'climate-effective reduced-impact logging' (RIL-C). Emissions per Mg carbon in extracted timber (termed 'carbon impact factor'; CIF) varied greatly both within and between countries—from 2.3 to 20.0. Within the studied geographies, CIF typically decreased with increasing logging intensity, but we found the opposite trend between countries. In general, Latin American countries had the lowest harvest intensities and lowest CIFs, and African countries had intermediate harvest intensities and the highest CIFs. The majority of logging emissions (59%) came from felling (felled tree residuals and collateral damage), but emissions from the countries with the highest CIFs were dominated by roads. Scaling-up, we estimated that tropical selective logging emitted 831 Tg CO_2 in 2015—6% of all greenhouse gas emissions from tropical countries. We propose a target CIF of 2.3 through RIL-C implementation. Such changes include improved bucking to increase timber recovery and reduce wood waste, building narrower haul roads, and using lower impact skidding equipment, as well as improving employee retention. If our target were achieved, timber supplies could be maintained while emissions from logging operations are reduced by 44% (365 Tg CO_2 year-1). On average,11% of nationally determined contributions by tropical countries to the Paris Climate Agreement could be met through RIL-C implementation.

Integrating climate change adaptation and mitigation objectives in British Columbia's forests

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Climate change mitigation and adaptation objectives have usually been treated separately in policies and interventions addressing climate change in the forests. However, increasing efforts have been directed towards the joint consideration of adaptation and mitigation objectives during the design of forest management interventions and policy. Not only are both climate objectives often compatible, but they also sometimes display synergies so that their combined effect is greater than the sum of their effects if implemented separately. Despite this potential, very few integrative initiatives have been attempted in practice. We use the case of the Canadian province of British Columbia (BC) to better understand the relationship between climate change adaptation and mitigation policy in the forests. Drawing on the review of existing forest management policy and a survey and semi-structured interviews with BC government officials, we address two major research objectives: (1) To what extent do current climate and non-climate BC forest management policies effectively integrate adaptation and mitigation objectives? (2) What challenges and opportunities are associated with the joint consideration of both objectives when developing forest management interventions and policy? Our results highlight the potential positive and/or negative ecological (e.g., ecosystem resilience, biodiversity), economic (e.g., cost or profitability) and social (e.g., effect on livelihood) outcomes of considering both adaptation and mitigation objectives together during the design of forest management interventions. We also provide policy insights into when and how to consider mitigation and adaptation together and to successfully mainstream both objectives into climate and non-climate forest management policies.

Mitigating climate change through Climate-Smart Forestry

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To achieve the objective of the Paris Climate Agreement, a significant reduction in CO_2 emissions is needed, as well as increased removals by carbon sinks. Forests play an important role in the discussion how to meet this objective. Storing carbon in forest ecosystems provides mainly benefits during the next few decades, but such a strategy is not free of risks. Many existing climate impact studies suggest an increasing risk from natural disturbances and accumulating more biomass in forests in high risk conditions may exacerbate the impact of future natural disturbances. A long-term, successful mitigation strategy must therefore consider adequate adaptation measures to ensure the resilience of forest resources in the future. A mitigation strategy that only emphasizes storing carbon in forest ecosystems also disregards the urgent need to decarbonize the global economy. In this presentation, we argue that a regionally-tailored Climate-Smart Forestry approach is needed to (a) increase the total forest area and avoid deforestation, (b) connect mitigation with adaption measures to enhance the resilience of global forest resources, and (c) produce wood-based products that store carbon and substitute emission-intensive fossil and non-renewable products and materials. We provide examples of measures related to each of the three issues. The challenge for forest management will be to find the right balance between short and long-term goals as well as between the need for wood production and other important ecosystem services. Such optimal balance may vary from country to country and region to region.

B8a: FOREST ADAPTATION AND RESTORATION UNDER GLOBAL CHANGE

Implementing forest landscape restoration under the Bonn Challenge

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The Bonn Challenge sets a goal for societies globally to restore 350 million hectares of forested landscapes by 2030. The Bonn Challenge is not a new commitment but rather a practical means of realizing many existing international commitments. Underlying the Bonn Challenge is forest landscape restoration (FLR), which aims to restore ecological integrity at the same time as improving human well-being through multi-functional landscapes. Translating the high level of political enthusiasm into real accomplishments requires a long-term commitment. Successful FLR is based on the premise that healthy landscapes provide a diversity of long-term benefits that can only be sustainably managed by and for local populations. Past experience with broad-scale restoration has shown the importance of defining and reconciling multiple objectives, a process that begins with well-defined goals and proceeds through implementation, monitoring, and adaptive management. FLR recognizes the need for local and adaptive options and avoids the "one size fits all" model. The emphasis on restoring mosaic landscapes requires integration of various land uses such as forestry (including timber plantations), agroforestry, agriculture, wildlife; biodiversity conservation; and infrastructure (roads and settlements). Although FLR favors historic fidelity, native species, and strongly advises against converting even degraded native forests to exotic plantations, the challenges imposed by climate change may in some circumstances also require adaptation to novel conditions. Implementing FLR requires detailed planning for what will be done, where, when, by whom, and at what cost. Included in the planning should be long-term monitoring and data archiving as well as on-going sustainable management.